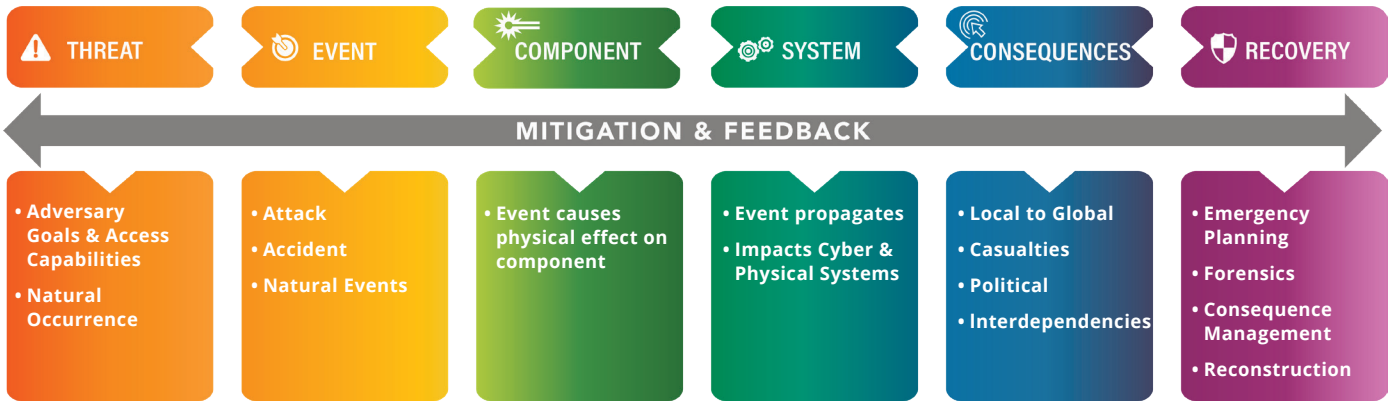
Sandia National Laboratories

ICPIA ™

Integrated Cyber Physical Impact Analysis

National infrastructure is increasingly reliant on advanced control technologies, which are becoming increasingly complex and interconnected. Protection is difficult; policymakers and system owners must consider new vulnerabilities and potential attacks. Sandia has developed an array of modeling and simulation capabilities, which can be integrated to deliver a differentiating defense approach. The result can be used to design secure architectures, provide test beds for integrating systems, explore the impact of previously unidentified threats and vulnerabilities, act as a training tool, and perform other valuable lifecycle functions.

Example Threat



- Threat: Adversary decides to create a “dirty bomb”
- Event: Access controls are duplicated to access a nuclear facility
- Component: Nuclear safety system is disabled
- Consequence: Radioactive contamination is dispersed across a complex geography
- Recovery: TEXT TO COME

ICPIA Use Cases

- Support New Threat Analysis
- Explore the impact of previously unidentified threats and vulnerabilities
- Provide Test Bed for Integrating Systems
- An Intrusion Detection System (IDS) can be installed and tested in the network emulation
- Help Design Secure Architectures
- Evaluating protective measures (detection, deter, respond) such as encryption
- Act as a Training Tool
- For Red Team attackers or for Plant Operators to develop cyber attack response procedures
- Identify R&D Gaps
- To reduce system risk
- Supports Integrated Risk Management
- Attack difficulty metrics, impact and consequence analysis, moving to “all hazards” analysis

ICPIA Framework

The ICPIA Framework integrates capabilities such as:

- Threat modeling
- Adversary-based vulnerability assessment
- Enterprise network and control system Emulytics™
- Physical modeling and simulation
- (device to system scale; across domains)
- Interrelated critical infrastructure impacts

For more information, please contact:

Mitch McCrory
Manager, Sandia National Laboratories
Email: fmmccro@sandia.gov
Phone: (505) 845-3031

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Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy’s National Nuclear Security Administration under contract DE-NA0003525. SAND2018-7113 M

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